RIETI Discussion Paper Series 10-E-022

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First Draft: December 1, 2009
This Draft: March 17, 2010

Abstract

In recent years, there has been an increase in the number of firms introducing anti-takeover provisions in Japan as well. In this paper, we analyze the characteristics of Japanese firms that introduced anti-takeover provisions during the four year period from fiscal 2005 to fiscal 2008, following the release of the official guidelines for anti-takeover provisions in 2005. Our main results are the following. First, firms' operating performance or stock market valuations were not related to the adoption of takeover defense measures. Second, firms' age and their ownership structure were correlated with the adoption of antitakeover provisions. Specifically, companies that were older, had lower proportions of shares held by their directors, or higher cross-shareholding ratios were more likely to adopt takeover defense measures, which suggests that the adoption of such measures is motivated by self-protection on the part of corporate managers and influenced by the conflicts of interest between managers and shareholders. In addition, as controlling shareholders had lower shares of stocks and institutional investors had higher shares of stocks, firms were more inclined to adopt takeover defense measures, suggesting that companies are likely to adopt such measures if their shares are liquid and easy to acquire.

Key words: Antitakeover provisions, entrenchment, Japan.

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1. Introduction

Why do some firms adopt takeover defense measures and why do others not? Motivations for adopting antitakeover provisions have attracted many researchers interested in corporate governance as well as policymakers. If firms are more likely to adopt antitakeover provisions when their performance deteriorates or when managers behave themselves for their own interests, then antitakeover provisions prevent the takeover that would discipline managers and increase firm values without them (e.g., Manne, 1965). On the other hand, if firms tend to adopt antitakeover provisions when they are in the danger of the takeover that breaches trust among the stakeholders including managers and workers, then antitakeover provisions protect firms from the value-destroying takeover (e.g., Shleifer and Summers, 1988).

We examine whether managers adopt antitakeover provisions for the purpose of managerial entrenchment, that is, to prevent themselves from losing their positions after takeovers. To this aim, Japanese experience servers as a quasi-natural experiment. In May 2005, the Japanese government released the guideline of antitakeover provisions, which endorsed Delaware takeover jurisprudence developed in the 1980s in the U.S. Since then, many firms adopted poison pills, though no firms had adopted antitakeover provisions before then. We consider the sudden emergence of antitakeover provisions in Japan as a good opportunity to study the relationship between ex ante firm characteristics and the decision whether or not to adopt antitakeover provisions. Without such an opportunity it would be difficult to distinguish the causal relationships between whether firm performance affects the decision of adopting antitakeover provisions or the adoption of antitakeover provisions affects firm performance. Distinguishing the causal relationship between the two is one of the most important contributions we make to the literature of antitakeover provisions.

Using Japanese firm data over the period of 2005-2008, we investigate the relationship between ex-ante firm characteristics and the decision of adopting antitakeover provisions. Though some preceding studies apply event study methodologies to the U.S. firms to investigate how stock price responds to the announcement of adopting antitakeover provisions, event studies are difficult to apply to Japanese firms because Japanese firms often release many pieces of information besides antitakeover provisions at the same time.

Most of the preceding studies focused on firms in the U.S. (Malatesta and Walking, 1988; Mallette and Fower, 1992; Strong and Meyer, 1990; Davis, 1991; Davis and Stout, 1991; Sundaramurthy, 1996; Davis and Greve, 1997; Danielason and Karpoff, 1998). However, the recent wave of mergers and acquisitions including hostile takeovers is spreading over most industrial countries and emerging markets, though it was temporarily interrupted by the recent credit crisis. It would be interesting to analyze the motives of adopting antitakeover provisions for firms in a country where corporate laws and governance are different from the U.S.

The rest of the paper is composed of four sections. In Section 2, we briefly describe the overview of hostile takeovers and antitakeover provisions in Japan. In Section 3, we present some hypotheses on the motives of adopting antitakeover provisions based on preceding studies. In Section4, we describe our dataset and estimation methodology. In Section 5, we present our estimation results. Section 5 concludes with some policy implications.

2. Overview of hostile takeovers and antitakeover provisions in Japan

In Japan, hostile takeovers were almost nonexistent until the early 2000s. Though there were some hostile bids by domestic and foreign investors at the end of the 1980s ("the bubble period"), they were unsuccessful. Traditionally, cross-shareholdings within a business group prevented hostile takeovers. As cross-shareholdings were gradually dissolved in the 1990s when stock prices stagnated and mark-to-market accounting was partially introduced, hostile takeover bids gradually increased. However, hostile raiders were still foreign-affiliated funds at the beginning of the 2000s. Since then, however, some domestic firms began to try hostile takeover bids against domestic firms. Faced with the real threat of hostile takeovers by domestic firms, Japanese firms sought for defensive measures.

In May 2005, the Japanese government released the guideline of antitakeover provisions, which endorsed Delaware takeover jurisprudence developed in the 1980s in the U.S.[1] Since then, many firms adopted antitakeover provisions of poison pills. Table 1 shows that the number of firms that adopted antitakeover provisions were none in fiscal year 2004, 47 in fiscal year 2005 and 132 in fiscal year 2008[2]. The proportion of firms that had adopted antitakeover provisions among those listed at Tokyo Exchange reached about one-seventh at the end of 2008. Among various antitakeover provisions, the prior warning type is very popular. They have a rule that must be followed by bidders pursuing takeovers, and

the breach of it leads to the implementation of defense measures such as the issuance of new stock reservation rights.

3. Hypotheses

What are the motives of adopting antitakeover provisions? This paper examines whether managers adopt them for the purpose of managerial entrenchment, that is, to protect themselves from the threat of losing their positions through takeovers. We classify the purpose of entrenchment into two categories. One is various measures of firm performance that are likely to depend on managers' efforts or quality. The other is firm characteristics that facilitate managerial entrenchment. In addition to these two entrenchment motives, we consider the probability of being a target of a takeover that is beyond managers' control at least in the short run.

A. Poor performance

Hostile takeovers can work as a disciplinary device on management by changing managers of poorly performing firms and thereby improving efficiency and shareholder values. In this case, poorly-performing firms are likely to be a target of a takeover because acquirers can improve firm performance to a great extent by changing managers (Manne, 1965). As firm performance is worse in terms of operating performance or stock market valuation, managers are more likely to adopt antitakeover provisions for the purpose of entrenchment. In addition, firms that have abundant liquid assets may do so because they are not required to return them to stockholders even though they cannot find growth opportunities. Hence firms with abundant liquid assets tend to spend them on inefficient projects for the sake of managers' private benefits (Jensen, 1986). Such firms are likely to be a target of hostile takeovers and consequently to adopt antitakeover provisions.

We can summarize the relationship between firm performance and the adoption of antitakeover provisions as the following three hypotheses with some relevant empirical evidences.

Hypothesis A1. Poor operating performance.

If a firm's operating performance is poorer, the firm is more likely to adopt antitakeover provisions.

Malatesta and Walking (1988) showed that those firms that adopted poison pills had seen significantly lower profitability in a previous year than those that did

not adopt them in the middle of the 1980s in the U.S. On the other hand, Mallette and Fower (1992) found no significant relationship between ROE and the adoption of poison pills in 1988 in the U.S.

Hypothesis A2. Poor stock market performance.

If stock market valuation is lower, the firm is more likely to adopt antitakeover provisions.

Strong and Meyer (1990) examined the U.S. firms and found that those firms that adopted poison pills saw lower price-to-earnings ratio (PER). Davis and Stout (1991) also found that those firms with lower market-to-book ratios are more likely to be a target of a takeover. On the other hand, Davis (1991), Sundaramurthy (1996), and Davis and Greve (1997) found that the market-to-book ratio is not significantly related to the adoption of poison pills.

Hypothesis A3. Liquidity.

Firms with more liquid assets are more likely to adopt antitakeover provisions.

Using the sample of Japanese firms, Xu (2008) finds that firms with high liquid asset ratios and low Tobin's Q were likely to be a target of hostile takeovers by some activist funds.

B. Entrenchment

Several firm characteristics represent how solid managers entrench themselves from outside shareholders: firm age, CEO's tenure, board composition, managerial stock ownership, and cross-shareholding, among others.

B1. Firm Age

Old firms tend to have inflexible organization and face difficulty in adapting themselves to the changes in environment. Furthermore, they tend to oppose to a drastic change of management and adopt antitakeover provisions to protect the status-quo.

Hypothesis B1. Firm age.

Old firms are more likely to adopt antitakeover provisions.

Davis and Stout (1992) show that in the U.S., older firms were more likely to be a target of takeovers.

B2. CEO's tenure

As a CEO holds her position for a longer time, she can exert a stronger influence on the board including the appointment of directors and thus can entrench herself from outsiders. She is likely to adopt poison pills to further strengthen their grips on her firm.

Hypothesis B2. CEO's tenure

Firms with a longer CEO's tenure are more likely to adopt antitakeover provisions.

Malette and Fowler (1992) studies companies included in the Standard and Poors 500 index and finds that the correlation between CEO's tenure and the likelihood of the adoption of poison pills was positive, though not statistically significant.

B3. Board composition

Outside directors are more likely to be objective and independent of management than insiders (Fama, 1980; Fama and Jensen, 1983). Outside directors are expected to monitor managers for the sake of shareholders. Hence firms with a board composed of a large share of insiders tend to adopt antitakeover provisions because such a board is likely to agree with the current managers (Davis, 1991; Mallette and Fowler, 1992; Sundaramurthy, 1996; Danielason and Karpoff, 1998).

Hypothesis B3. Board composition.

Firms with a board composed of a larger share of insiders and a smaller share of independent outsiders are more likely to adopt antitakeover provisions.

Empirical evidences for the U.S. firms are mixed. Mallette and Fowler (1992) and Sundaramurthy (1996) find that the share of outside directors and the likelihood of adopting poison pills was positive, though not significant, for the U.S. firms. On the other hand, Danielason and Karpoff (1998) find that the less the proportion of inside directors is, the more likely the firm is to adopt poison pills.

They find that this relationship is significant. Davis (1991) and Davis and Greve (1997) find similar results to Danielason and Karpoff (1998), though not significant.

B4. Managerial stock ownership and cross-shareholdings

Ownership has a great impact on to what extent managers' interests are aligned to those of stockholders. A larger share of managerial stock ownership suggests a greater degree of alignment between the two. A lower share of managerial ownership may result in the conflicts of interests and managerial entrenchment, and hence the adoption of antitakeover provisions (Malatesta and Walking, 1988; Davis, 1991; Mallete and Fowler, 1992). On the other hand, a larger share of managerial ownership can empower managers and result in entrenchment (Demsetz, 1983; Fama and Jensen, 1983). These two opposing arguments concerning managerial ownership may be settled by non-linear effects on the degree of firm value. Morck et al. (1988) finds an inverse U-curve relationship between managerial ownership and the firm value. However, since it is often difficult to detect a nonlinear relationship, we simply present two opposing hypotheses concerning the effects of managerial ownership on the adoption of antitakeover provisions.

In addition to managerial ownership, cross-shareholdings in a business group have been used as a takeover defense measure in Japan since capital accounts were liberalized in 1964. A high share of cross-shareholdings suggests that managerial entrenchment is solid and can result in a high likelihood of adopting antitakeover provisions.

Hypothesis B4. Managerial ownership as the alignment of manager/shareholder interests.

Firms with a lower share of managerial ownership is more likely to adopt antitakeover provisions.

Hypothseis B5. Managerial ownership as entrenchment.

Firms with a higher share of managerial ownership is more likely to adopt antitakeover provisions.

Hypothesis B6. Cross-shareholding

Firms with a higher share of cross-shareholding is more likely to adopt antitakeover provisions.

Many empirical studies for the U.S. firms find that a low share of managerial ownership results in a high likelihood of adopting poison pills (Malatesta and Walking, 1988; Strong and Meyer, 1990; Davis, 1991; Mallete and Fowler, 1992; Davis and Greve, 1997; Danielson and Karpoff, 1998). On the other hand, Sundaramurthy (1996) finds a U-curve relationship between the share of managerial ownership and the likelihood of adopting poison pills.

C. Other factors affecting the probability of being a target of a hostile takeover

Some other factors affect the probability that a firm becomes a target of a hostile takeover though they are beyond managers' control at least in the short-run, and hence the likelihood of adopting antitakeover provisions either for managerial entrenchment or prevention from the breach of trust. We consider firm size, stock liquidity and ownership, leverage, and adoption of antitakeover provisions by rivals, among others.

C1. Firm size

Acquirers, when financially constrained, can acquire a firm more easily when the target firm has a small size in terms of market value (Davis and Schwert, 1995; Davis and Greve, 1997). To protect themselves, small firms tend to adopt antitakeover provisions.

Hypothesis C1. Firm size

Firms with a smaller market value are more likely to adopt antitakeover provisions.

Davis (1991) and Davis and Greve (1997) finds that among the U.S. firms, firms with smaller market values were more likely to adopt poison pills. Comment and Schwert (1995), on the other hand, find that firms with a larger asset size tended to adopt poison pills in the U.S.

C2. Stock liquidity and ownership

If stocks are held more by foreigners, individuals or other dispersed investors and less by stable stockholders including business partners and financial institutions, stocks become more liquid and hence hostile takeovers are more likely to be successful (Danielson and Karpoff, 1998). Xu (2007) finds that in Japan, as the share of dominant stable shareholders is low, the firm is more likely to be a target of hostile takeovers.

As for the share of institutional stockholders, two competing effects are possible. If institutional investors including foreign investors have a short horizon

and easily sell their shares in response to tender offers, firms whose shares are held by institutional investors are likely to adopt antitakeover provisions (Mallette and Fowler, 1992; Davis and Stout, 1992). On the other hand, if institutional investors behave themselves in the interests of general stockholders, a large share of institutional investors may result in difficulty in adopting antitakeover provisions (Sundaramurthy, 1996).

Hypothesis C2.

a) Dominant shareholders

A low share of ownership by dominant shareholders and a high share of small shareholders result in a high likelihood of adopting antitakeover provisions.

b) Institutional shareholders (with short time horizons)

A high share of ownership by institutional shareholders results in a high likelihood of adopting antitakeover provisions.

c) Institutional shareholders (as a monitor)

A high share of institutional shareholders results in a low likelihood of adopting takeover provisions.

Davis (1991) and Davis and Greve (1997) finds that in the U.S., a low level of concentration in ownership results in a high likelihood of adopting poison pills. As for the effects of institutional investors, many researchers find a positive correlation between the share of institutional shareholders and the likelihood of adopting poison pills for U.S. firms (Strong and Meyer, 1990; Davis, 1991; Mallette and Fowler, 1992; Davis and Greve, 1997; Danielson and Karpoff, 1998), though Sundaramurthy (1996) finds no significant correlation between them.

C3. Leverage

Hostile takeovers are often done for the purpose of redistribute free cash flow to stockholders by raising leverage (Jensen, 1989). Low-levered firms are more likely to be a target and hence to adopt antitakeover provisions.

Hypothesis C3. Firms with lower debt-to-asset ratios are more likely to adopt antitakeover provisions.

Davisn and Stout (1992) find that in the U.S., firms with low debt-to-asset ratio were more likely to be a target. Xu (2007) finds a similar tendency for Japanese firms.

C4. Adoption of antitakeover provisions by rival firms

As more firms in the same industry adopt antitakeover provisions, firms without antitakeover provisions are more likely to be a target (Davis, 1991). In addition, the adoption of antitakeover provisions may not result in a deterioration of stock market if more firms have already adopted them and this may mitigate a CEO's hesitation for it.

Hypothesis C4. A high proportion of firms in the industry that have adopted antitakeover provisions results in a high likelihood of adopting antitakeover provisions.

Davis (1991) finds no significant correlation between the proportion of firms in the same industry that adopted antitakeover provisions and the likelihood of each firm adopting them for U.S. firms.

4. Data and Methodology

Our data source for financial statements and measures of corporate governance is NEEDS-Corporate Governance Evaluation System, abbreviated as NEEDS-CGES, published by Nikkei Digital Media. NEEDS-CGES is a dataset containing various measures of corporate governance, including ownership structure and board members.

Sample firms are firms listed on stock exchanges in Japan[3] except for those firms that are determined to be delisted, Real Estate Investment Trusts (REITs), Exchange-Traded Funds (ETFs), preferred stocks, Bank of Japan, firms listed in the foreign country section of Tokyo Stock Exchange and Venture Funds listed in Osaka Stock Exchange. The number of sample firms are 3761, 3809, 3937 and 3883 as of March 2005, March 2006, March 2007 and March 2008, respectively.

We use the financial statements of the accounting years just before the decision of adopting antitakeover provisions. Most Japanese firms adopt the accounting year beginning in April and ending in March. Therefore, when we examine the decision of adopting antitakeover provisions during the period from April 2005 to March 2006, we use the financial statements ending in March 2005. If firms adopt the

accounting year otherwise, we use the financial statements ending before the decision of adopting antitakeover provisions.

Data source on the adoption of antitakeover provisions is a member service by Commercial Law Center Inc. (CLC, or *Shoji Homu Kenkyu Kai* in Japanese) and firms' press releases. Data from CLC includes the names of the firms that adopted antitakeover provisions, the dates of their adoptions, and the contents of the provisions. Another possible data source of antitakeover provisions is *Monthly MARR* published by RECOF. We confirmed that our sample is more comprehensive than *Monthly MARR* in that all of the firms contained by *Monthly MARR* that adopted antitakeover provisions were included in our sample firms.

We estimate the likelihood of adopting antitakeover provisions using the following Probit model for each accounting year, in which the dependent variable, *Poison*, takes the value of unity if the firm adopted antitakeover provisions and zero otherwise.

(1) $Poison_i^* = cons. + x_{i,A}^{'}\beta_A + x_{i,B}^{'}\beta_B + x_{i,C}^{'}\beta_C + e_i$

$Poison_i = 1$ $Poison_i^* > 0$

$Poison_i = 0$ $Poison_i^* \le 0$

The dependent variable, $Poison^*$, is a latent variable that affects the decision of firm i's adopting antitakeover provisions. Three vectors of explanatory variables, A, B and C represent relevant measures of the hypotheses described in the previous section. *Const.* is a constant and βs are coefficient vectors on each vector of explanatory variables. e is a random error. We describe the dependent variables. See Appendix for the details of the variables.

The first explanatory variables represent measures of firm performance: returns on assets (ROA), Tobin's Q, price-to-book ratio (PBR), and liquid asset ratio. Hypotheses A1 thorough A3 suggest that ROA, Tobin's Q, and PBR take negative coefficients and liquid asset ratio takes a positive coefficient.

The second explanatory variables represent measures of managerial entrenchment: firm age, CEO's tenure, the proportion of outside directors, the share of managerial ownership, and the share of cross-holdings. Hypotheses B1 through B6 suggest that the firm age, CEO's tenure, and the share of cross-holdings take positive coefficients, while the share of outside directors take negative coefficients. The share of managerial ownership takes either positive or negative coefficient.

The third explanatory variables are control variables that affect the likelihood of being a target of hostile takeovers: the logarithm of market-valued equity, the

share of ownership by dominant shareholders, the share of ownership by institutional investors, the share of minority shareholders, the debt-to-asset ratio, and the proportion of firms that adopted antitakeover provisions in the industry of the firm. Hypotheses C1 through C4 suggest that the logarithm of market-valued equity, the share of dominant shareholders, and the debt-to-asset ratio take negative coefficients while the share of institutional investors, the share of minority shareholders, and the proportion of the firms that adopted antitakeover provisions in the industry take positive coefficients.

Table 2 summarizes descriptive sample statistics of the above variables. Table 2 also reports the test statistics of whether the means and medians are different between those firms that adopted antitakeover provisions and those that did not[4].

Several features are evident from Table 2. First, the differences in performance measures are not clear. For example, though the means of Tobin's Q are lower for firms adopting antitakeover provisions than those not adopting them in some years, the medians of ROA and Tobin's Q are opposites. Second, firm age and the share of cross-shareholdings are significantly higher and the share of outside directors and the share of managerial ownership are significantly lower for firms adopting antitakeover provisions than those not adopting them either in terms of means or medians, which are consistent with Hypotheses B1, B6, B3 and B4, respectively. Third, among the control variables, the share of ownership by dominant shareholders and the debt-to-asset ratio are significantly lower and the share of ownership by institutional investors is significantly higher for firms adopting antitakeover provisions than for firms not adopting them, which are consistent with C2a, C3 and C2b, respectively, though the significance levels of the debt-to-asset ratio vary depending on years. In addition, the proportion of firms that adopted antitakeover provisions in the industry is higher for firms adopting antitakeover provisions, consistent with Hypothesis C4.

5. Baseline results

Table 3 shows the baseline year-by-year estimation results. The first and second rows show the coefficient and the marginal effects at the mean value of each explanatory variable. Because ROA, Tobin's Q, and PBR are highly correlated with one another, we include these variables one by one.

A. Performance

Among the performance measures, we find that none of ROA, Tobin's Q or PBR

is significant for any year, not supporting Hypothesis A1 or A2[5]. Looking at the results for year 2005, we find that the liquid asset ratio is significantly positive, consistent with Hypothesis A3. However, the significance of the liquid asset ratio disappears for years 2006 and later.

B. Entrenchment

Table 3 suggests that firms with high degree of managerial entrenchment tend to adopt antitakeover provisions.

First, firm age takes positive and marginally significant coefficients in one specification (with ROA as a performance measure) for years 2006 and 2008, consistent with Hypothesis B1.

Second, the share of managerial ownership takes negative and significant coefficients for years 2006 and 2007, and a marginally significant coefficient for year 2008, suggesting that managerial ownership serves as alignment of interests between stockholders and managers (Hypothesis B4).

Third, the share of cross-shareholdings takes positive and significant coefficients for years 2006, 2007 and 2008. Though firms with a high share of cross-shareholdings are unlikely to be a target of hostile takeovers (Xu, 2006), they tend to adopt antitakeover provisions. This result strongly suggests a strong motive for managerial entrenchment (Hypothesis B6).

On the other hand, CEO's tenure and the share of outside directors do not take significant coefficients. The Guideline strongly suggests that the judgment by outside directors be valued in deciding the adoption of antitakeover provisions as an example of ensuring their necessity and validity. The Guideline may have an effect that firms with a higher share of outside directors may easily adopt antitakeover provisions. One may suspect that firms may have increased the number of outside directors to adopt antitakeover provisions in accordance with the Guideline after it was released. If this is the case, the estimated coefficient is biased upwards. To deal with this possible endogeneity, we later use as an instrumental variable the share of outside directors as of 2004, before the Guideline was released, to estimate the likelihood of adopting antitakeover provisions in years 2006 and later.

C. Control variables

First, the logarithm of market value takes positive and significant coefficients, which contradicts with Hypothesis C1. A small firm may find it difficult or costly to adopt antitakeover provisions. Comment and Schwert (1995) also finds a positive

correlation between firm size and the likelihood of adopting poison pills for US firms, insisting that adopting poison pills requires a fixed cost including attorneys' fees and hence exhibits a scale economy.

Second, the share of ownership by dominant shareholders takes negative and significant coefficients for all years, consistent with Hypothesis C2a. The share of ownership by institutional shareholders takes positive and significant coefficients for year 2006, suggesting that institutional investors have short time horizons (Hypothesis C2b) rather than work as effective monitors, though this result holds only for one year.

Third, the debt-to-asset ratio takes negative and significant coefficients for year 2006, consistent with Hypothesis C3.

Finally, the proportion of firms adopting antitakeover provisions in the industry of the firm takes positive and significant coefficients for years 2007 and 2008, consistent with Hypothesis C4.

5. Robustness

In this section, we check the robustness of the baseline results above by changing specifications. To save space we show results only for ROA as a performance measure, but most of the results do not change when we use Tobin's Q or PBR[6].

5.1 Endogeneity of the share of outside directors

After the Guideline was published in 2005, the firms that wanted to adopt antitakeover provisions may have increased the share of outside directors to comply with the Guideline before they actually adopted them. To deal with such potential endogeneity, we estimate the likelihood of adopting antitakeover provisions in years 2006 and later by conducting instrumental variable probit estimation using as instruments the share of outside directors as of year 2004. Table 4 shows the estimation results. Wald test of exogeneity shows that the error terms in the structural equation (probit) and the reduced-form equation for the endogenous variable (i.e., the share of outside directors) are not significantly correlated, suggesting that the endogeneity bias in the baseline estimation is not significant. The coefficients on the share of outside directors are insignificant as in the baseline results.

5.2 Free cash flow hypothesis

Free cash flow hypothesis (Jensen, 1986) posits that firms with more liquid assets but with less growth opportunities tend to be a target of hostile takeovers. Xu (2007) lends support to this hypothesis using Japanese firm data. Those firms may be more likely to adopt antitakeover provisions. To test this hypothesis, we use a dummy variable that takes unity if Tobin's Q is below its median for each year (1.075, 1,203, 1.204, and 1.105 in years 2005, 2006, 2007 and 2008, respectively) and zero otherwise and use as an explanatory variable the intersection of this dummy and the liquid asset ratio. To save space, we omit the table of this result[7], but this intersection term does not take significant coefficients in any year.

5.3 Firm value protection hypothesis

Firms may adopt antitakeover provisions in order to protect the firm value from the hostile takeovers that destroy the firm value either by breaching the long-run implicit contract between managers and workers or by redirecting the firm operation towards maximizing short-run cash flow. To explore this hypothesis, we take two alternative specifications.

First, according to the breach of trust hypothesis, firms are more likely to adopt antitakeover provisions when their operating performances temporarily worsen. This will cause a downward bias to the operating performance measures. We deal with this potential bias by using operating performance measures averaged over three-year up to the previous year. Though we omit the table[8], most of the coefficients are similar to the baseline results except for the firm age, which turns to be insignificant.

Next, we see whether firms tend to adopt antitakeover provisions as they are rich in long-run investment opportunities. As a measure of long-run investment, we use research and development expenditures as a proportion of sales, referred to as R&D intensity hereafter. Firms may adopt antitakeover provisions in order to protect from curtailing R&D intensity from the short-run viewpoint or from transferring intelligent assets to other firms via scorched earth strategies. The data source of R&D intensity is a database published by Development Bank of Japan. The sample size is slightly smaller than the size in the baseline estimation (2784, 3037, 2727, and 2607 in years 2005-2008, resepectively). Table 5 shows the results. The coefficients on R&D intensities are negative and insignificant, not supporting the short-termism hypothesis. Most of the other variables are similar to the baseline estimation results. We also use R&D expenditures as a proportion of total assets and obtain insignificant coefficients on them.

E. Panel Estimation

As a final robustness check, we pool the data from year 2005 through year 2008 and apply a panel data estimation method. If a firm's decision of adopting antitakeover provisions is hit by idiosyncratic shocks that do not change over time, a random-effect probit model is an appropriate model. The dependent variable is a dummy that takes unity if the firm adopted antitakeover provisions in the year or before and zero otherwise. The explanatory variables are lagged one year as in the baseline model. The proportion of firms adopting antitakeover provisions in the industry of the firm is excluded from the explanatory variables because its value as of year 2005 is not available. We add year dummies to the explanatory variables.

Table 6 shows the estimation results. The specification test favors the random-effect probit model against the pooled probit model. The results are quite similar to the baseline results. The performance measures are not significant. Among the entrenchment measures, firm age, the share of managerial ownership, and the share of cross-shareholdings are significant with expected signs. Among the control variables, the logarithm of market value, the share of dominant shareholders, and the debt-to-asset ratio are significant with the same signs as in the benchmark year-by-year estimation results.

6. Conclusions

We tested the managerial entrenchment hypothesis on the motive of adopting antitakeover provision using Japanese firm data over the period of April 2005 through March 2009. Specifically, we tested whether the firm's operating performance measures and the entrenchment measures are related to the likelihood of adopting antitakeover provisions. Our results can be summarized as follows.

A. Firm performance measured by ROA, Tobin's Q and PBR is not correlated with the likelihood of adopting antitakeover provisions.

B. Managerial entrenchment measured by the old firm age, the low share of managerial ownership and the high share of cross-shareholdings are significantly correlated with the likelihood of adopting antitakeover provisions.

C. Market liquidity, measured by the low share of ownership by dominant shareholders and the high share of ownership by institutional investors, is significantly correlated with the likelihood of adopting antitakeover provisions. The liquid asset ratio, the debt-to-asset ratio, and the proportion of firms adopting antitakeover provisions in the industry are also significantly correlated with the

likelihood of adopting antitakeover provisions.

In sum, though firms do not tend to adopt antitakeover provisions in response to worsening operating performance, they are more likely to do so when managerial entrenchment is more solid. The positive correlation between the share of cross-shareholdings and the likelihood of adopting antitakeover provisions, in particular, strongly suggests the entrenchment motive, because firms with a higher share of cross-shareholdings are less likely to be a target of hostile takeover and yet more likely to adopt antitakeover provisions.

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Appendix. Variables

A. Measures of performance.

ROA: current profits as a proportion of total assets as of the previous accounting year.

Tobin's Q: the sum of market-valued stocks and book-valued debt as a proportion of total assets including unrealized profits (or losses) of subsidiaries and affiliates.

PBR: market-valued stocks as a proportion of book-valued shareholders' equity.

Liquid asset ratio: the sum of cash and deposits, securities and securities for investment as a proportion of total assets. We delete those firms with negative liquid assets from the sample.

B. Measures of entrenchment.

Firm age: the difference between the current year and the year when the firm was established. The latter is available in Quarterly Company Report ("*Kaisha Shiki Ho*") published by Toyo Keizai Shimpo Sha.

CEO's tenure: the differenc between the current year and the year when the current CEO took her position.

Share of outside directors: the number of outside directors as a proportion of total number of directors.

Share of managerial ownership: Share of stocks held by managers . Firms with more than 100 percent is estimated to be held by mangers are excluded from the sample.

Share of cross-holdings: Share of stocks held by listed companies whose shares are held by the firm, estimated by Nissei Life Insurance (NLI) Research Institute.

C. Control variables.

Logarithm of market-valued equity. Natural logarithm of market-valued equity.

Share of ownership by dominant shareholders: Share of controlling firms, which owns more than 15 percent share of the firm

Share of ownership by institutional investors: Shares of ownership by foreigners excluding foreign corporations, trust accounts, and special accounts of life insurance companies

Share of minority shareholders: Share of ownership by individuals and firms that own less than 50 trading units.

Debt-to-asset ratio: total debt as a proportion of total assets.

The proportion of firms that adopted antitakeover provisions in the industry of the

firm: Available only for accounting year 2005 and afterwards.

R&D intensity: expenditures on research and development as a proportion of sales.

Data source is Financial Statement Data Bank published by Development Bank of Japan.

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[1] The guideline is titled "Guideline of the takeover defense measures for the joint interests of firm value and shareholders." The Guideline stresses three principles of takeover defense measures: i) protecting and enhancing corporate value and the interests of shareholders as a whole, ii) emphasizing prior disclosure and shareholder's will, and iii) ensuring the necessity and reasonableness, preventing defense measures from being too excessive.

[2] Fiscal years begin in April and ends in March of the next year.

[3] Tokyo, Osaka, Nagoya, Sapporo and Fukuoka Excnages and Jasdaq, Tokyo Mothers, Osaka Heracules.

[4] For the equality of medians, we conducted a non-parametric 2-sample test. It tests the null hypothesis that the two samples are drawn from populations with the same median. The chi-squared test statistic is computed. For the equality of means, we conducted a t-test.

[5] As a robustness check, we used the deviations from the industry-median of the performance measures to control for the effects of industrial shocks to firm performance and found no significant coefficients on the performance measures. The results are available from the authors upon request.

[6] The results for Tobin's Q and PBR are available from the authors upon request.

[7] The results including the intersection term of the Q dummy and the liquid asset ratio are available from the authors upon request.

[8] The results using three-year average operating performance measures are available from the authors upon request.

Table 1 Number of firms that adopted antitakeover provisions

	Number of firms	
2005FY	47	(1.2%)
2006FY	149	(4.0%)
2007FY	237	(6.1%)
2008FY	132	(3.5%)
Total	565	(14.8%)

Sources: Commercial Law Center Inc. and Recof.

Note: The proportion of firms that had adopted antitakeover provisions among all listed firms are shown in parentheses.

Table 2 Descriptive statistics

Difference of means test 2005FY

	Firms adopted antitakeover provisions (A)	Firms not adopted antitakeover provisions (B)	Mean (A)	Mean (B)	Difference of means (A−B)	
ROA	47	3698	0.064	0.066	-0.003	
Tobin's Q	47	3639	1.476	1.490	-0.014	
PBR	47	3626	1.937	2.243	-0.305	
Liquid asset ratio	47	3558	0.299	0.242	0.057	**
Firm age	47	3714	52.468	45.609	6.860	*
CEO's tenure	47	3714	3.936	6.987	-3.051	**
Proportion of outside directors	47	3714	0.094	0.070	0.025	
Share of managerial ownership	47	3626	0.046	0.094	-0.047	**
Share of cross-holdings	47	3618	0.092	0.074	0.018	
Logarithm of market-value equity	47	3601	10.895	9.798	1.097	***
Share of dominant shareholders	47	3714	0.044	0.146	-0.103	***
Share of institutional investors	47	3594	0.241	0.133	0.108	***
Share of minority shareholders	46	3655	0.225	0.227	-0.002	
Debt-to-asset ratio	47	3706	0.498	0.547	-0.049	

Difference of medians test 2005FY

	Median (A)	Median (B)	Difference of medians (A−B)	
ROA	0.045	0.048	-0.003	
Tobin's Q	1.346	1.256	0.090	
PBR	1.113	1.074	0.039	
Liquid asset ratio	0.264	0.204	0.060	
Firm age	55.000	49.000	6.000	**
CEO's tenure	2.000	4.000	-2.000	
Proportion of outside directors	0.000	0.000	0.000	
Share of managerial ownership	0.014	0.022	-0.008	
Share of cross-holdings	0.092	0.050	0.042	***
Logarithm of market-value equity	10.702	9.579	1.123	***
Share of dominant shareholders	0.000	0.000	0.000	***
Share of institutional investors	0.196	0.080	0.116	***
Share of minority shareholders	0.201	0.215	-0.015	
Debt-to-asset ratio	0.500	0.554	-0.054	

Difference of means test 2006FY

	Firms adopted antitakeover provisions (A)	Firms not adopted antitakeover provisions (B)	Mean (A)	Mean (B)	Difference of means (A−B)	
ROA	149	3643	0.073	0.070	0.002	
Tobin's Q	149	3581	1.468	1.741	-0.273	
PBR	149	3576	2.020	2.675	-0.656	
Liquid asset ratio	148	3496	0.265	0.258	0.007	
Firm age	149	3636	61.101	46.086	15.015	***
CEO's tenure	149	3660	5.060	7.035	-1.975	***
Proportion of outside directors	149	3660	0.091	0.081	0.010	
Share of managerial ownership	149	3555	0.026	0.097	-0.071	***
Share of cross-holdings	147	3544	0.108	0.063	0.045	***
Logarithm of market-value equity	147	3428	4.587	4.513	0.074	
Share of dominant shareholders	149	3660	0.030	0.151	-0.120	***
Share of institutional investors	149	3554	0.276	0.147	0.129	***
Share of minority shareholders	149	3593	0.209	0.213	-0.004	
Debt-to-asset ratio	149	3654	0.477	0.536	-0.059	
Proportion of the firms that adopted antitakeover provisions in the industry	149	3660	0.015	0.012	0.003	***

Difference of medians test 2006FY

	Median (A)	Median (B)	Difference of medians (A−B)	
ROA	0.064	0.053	0.010	**
Tobin's Q	1.759	1.571	0.188	**
PBR	1.307	1.199	0.108	**
Liquid asset ratio	0.243	0.218	0.025	**
Firm age	59.000	48.000	11.000	***
CEO's tenure	3.000	4.000	-1.000	*
Proportion of outside directors	0.000	0.000	0.000	***
Share of managerial ownership	0.005	0.024	-0.019	***
Share of cross-holdings	0.099	0.039	0.061	***
Logarithm of market-value equity	4.517	4.367	0.151	***
Share of dominant shareholders	0.000	0.000	0.000	***
Share of institutional investors	0.263	0.097	0.167	***
Share of minority shareholders	0.182	0.197	-0.015	
Debt-to-asset ratio	0.475	0.543	-0.068	**
Proportion of the firms that adopted antitakeover provisions in the industry	0.011	0.009	0.002	***

Difference of means test 2007FY

	Firms adopted antitakeover provisions (A)	Firms not adopted antitakeover provisions (B)	Mean (A)	Mean (B)	Difference of means (A−B)	
ROA	234	3409	0.074	0.070	0.004	
Tobin's Q	232	3349	1.479	1.759	-0.280	**
PBR	232	3344	2.098	2.716	-0.618	**
Liquid asset ratio	231	3274	0.260	0.259	0.001	
Firm age	234	3426	58.274	46.317	11.957	***
CEO's tenure	234	3426	7.650	8.062	-0.412	
Proportion of outside directors	234	3426	0.072	0.082	-0.010	
Share of managerial ownership	230	3328	0.045	0.102	-0.057	***
Share of cross-holdings	232	3312	0.100	0.060	0.040	***
Logarithm of market-value equity	232	3351	10.905	10.072	0.833	***
Share of dominant shareholders	234	3426	0.036	0.158	-0.122	***
Share of institutional investors	230	3324	0.230	0.141	0.089	***
Share of minority shareholders	232	3361	0.209	0.213	-0.004	
Debt-to-asset ratio	234	3420	0.510	0.537	-0.027	**
Proportion of the firms that adopted antitakeover provisions in the industry	234	3426	0.061	0.049	0.012	***

Difference of medians test 2007FY

	Median (A)	Median (B)	Difference of medians (A−B)	
ROA	0.060	0.053	0.007	**
Tobin's Q	1.233	1.195	0.038	*
PBR	1.581	1.567	0.014	
Liquid asset ratio	0.238	0.218	0.020	*
Firm age	58.000	48.000	10.000	***
CEO's tenure	5.000	5.000	0.000	
Proportion of outside directors	0.000	0.000	0.000	
Share of managerial ownership	0.009	0.025	-0.016	***
Share of cross-holdings	0.087	0.036	0.051	***
Logarithm of market-value equity	10.794	9.833	0.961	***
Share of dominant shareholders	0.000	0.000	0.000	***
Share of institutional investors	0.215	0.091	0.124	***
Share of minority shareholders	0.198	0.197	0.001	
Debt-to-asset ratio	0.515	0.546	-0.031	**
Proportion of the firms that adopted antitakeover provisions in the industry	0.050	0.048	0.002	***

Difference of means test 2008FY

	Firms adopted antitakeover provisions (A)	Firms not adopted antitakeover provisions (B)	Mean (A)	Mean (B)	Difference of means (A−B)	
ROA	129	3355	0.067	0.065	0.002	
Tobin's Q	130	3299	1.178	1.377	-0.199	**
PBR	130	3289	1.425	2.375	-0.950	
Liquid asset ratio	131	3208	0.238	0.251	-0.013	
Firm age	131	3374	61.221	45.324	15.897	***
CEO's tenure	131	3374	7.290	7.981	-0.691	
Proportion of outside directors	131	3374	0.060	0.090	-0.031	***
Share of managerial ownership	130	3291	0.051	0.107	-0.056	***
Share of cross-holdings	128	3282	0.120	0.060	0.060	***
Logarithm of market-value equity	130	3310	10.642	9.763	0.879	***
Share of dominant shareholders	131	3373	0.028	0.164	-0.136	***
Share of institutional investors	130	3283	0.206	0.136	0.069	***
Share of minority shareholders	131	3327	0.212	0.211	0.002	
Debt-to-asset ratio	131	3352	0.530	0.537	-0.007	
Proportion of the firms that adopted antitakeover provisions in the industry	131	3373	0.140	0.105	0.036	***

Difference of medians test 2008FY

	Median (A)	Median (B)	Difference of medians (A−B)	
ROA	0.057	0.050	0.007	
Tobin's Q	1.101	1.089	0.012	
PBR	1.240	1.278	-0.037	
Liquid asset ratio	0.214	0.209	0.005	
Firm age	61.000	46.000	15.000	***
CEO's tenure	4.000	5.000	-1.000	
Proportion of outside directors	0.000	0.000	0.000	**
Share of managerial ownership	0.010	0.028	-0.018	***
Share of cross-holdings	0.105	0.032	0.073	***
Logarithm of market-value equity	10.575	9.460	1.115	***
Share of dominant shareholders	0.000	0.000	0.000	***
Share of institutional investors	0.177	0.084	0.094	***
Share of minority shareholders	0.180	0.192	-0.012	
Debt-to-asset ratio	0.549	0.547	0.002	
Proportion of the firms that adopted antitakeover provisions in the industry	0.138	0.087	0.051	***

Notes: we conduct two sample t tests with equal variances for the mean tests and non-parametric two sample tests for the median tests.
*, **, *** statistically significant at 10%, 5% and 1%.

Table 3 What firms do adopt antitakeover provisions?: Probit model

Adopted 2005FY

	(1)			(2)			(3)		
Explanatory variable	Coef.	Marginal Effect	Z-value	Coef.	Marginal Effect	Z-value	Coef.	Marginal Effect	Z-value
ROA	0.0475	0.0010	0.08						
Tobin's Q				-0.0184	-0.0004	-0.36			
PBR							-0.0188	-0.0004	-0.63
Liquid asset ratio	1.1647	0.0243 **	2.47	1.2128	0.0254 **	2.49	1.2613	0.0262 ***	2.57
Firm age	-0.0002	0.0000	-0.07	-0.0004	0.0000	-0.14	-0.0006	0.0000	-0.2
CEO's tenure	-0.0196	-0.0004 *	-1.69	-0.0198	-0.0004 *	-1.71	-0.0198	-0.0004 *	-1.72
Proportion of outside directors	0.3073	0.0064	0.68	0.3178	0.0066	0.7	0.3375	0.0070	0.74
Share of managerial ownership	-1.3526	-0.0282	-1.6	-1.2885	-0.0269	-1.53	-1.2701	-0.0264	-1.5
Share of cross-holdings	-0.0817	-0.0017	-0.1	-0.1097	-0.0023	-0.13	-0.1693	-0.0035	-0.19
Logarithm of market-value equity	0.0851	0.0018 *	1.65	0.0887	0.0019 *	1.69	0.0923	0.0019 *	1.76
Share of dominant shareholders	-1.3814	-0.0288 ***	-2.74	-1.3568	-0.0284 ***	-2.7	-1.3536	-0.0281 ***	-2.7
Share of institutional investors	0.2958	0.0062	0.54	0.2989	0.0063	0.55	0.2836	0.0059	0.52
Share of minority shareholders	0.2109	0.0044	0.34	0.2361	0.0049	0.38	0.2371	0.0049	0.38
Debt-to-asset ratio	0.1374	0.0029	0.38	0.1345	0.0028	0.38	0.2001	0.0042	0.54
Constant	-3.2434	***	-5.14	-3.2601	***	-5.14	-3.3179	***	-5.17
Number of obs	3427			3427			3427		
LR chi2	48.63			48.77			49.28		
Prob > chi2	0			0			0		
Pseudo R2	0.0997			0.0999			0.101		
Log likelihood	-219.67			-219.60			-219.35		

Adopted 2006FY

	(1)			(2)			(3)		
Explanatory variable	Coef.	Marginal Effect	Z-value	Coef.	Marginal Effect	Z-value	Coef.	Marginal Effect	Z-value
ROA	0.3260	0.0143	0.49						
Tobin's Q				-0.0535	-0.0023	-0.88			
PBR							-0.0165	-0.0007	-0.52
Liquid asset ratio	-0.3179	-0.0140	-0.87	-0.2645	-0.0115	-0.71	-0.2926	-0.0128	-0.79
Firm age	0.0037	0.0002 *	1.66	0.0034	0.0001	1.51	0.0036	0.0002	1.58
CEO's tenure	-0.0034	-0.0002	-0.52	-0.0038	-0.0002	-0.57	-0.0036	-0.0002	-0.54
Proportion of outside directors	0.2867	0.0126	0.85	0.2922	0.0127	0.87	0.2772	0.0121	0.83
Share of managerial ownership	-3.2521	-0.1430 ***	-3.84	-3.1475	-0.1373 ***	-3.75	-3.1711	-0.1386 ***	-3.77
Share of cross-holdings	1.7420	0.0766 ***	2.92	1.7106	0.0746 ***	2.86	1.7187	0.0751 ***	2.87
Logarithm of market-value equity	0.0922	0.0041 *	1.9	0.1167	0.0051 **	2.37	0.1108	0.0048 **	2.16
Share of dominant shareholders	-1.9019	-0.0837 ***	-4.89	-1.8831	-0.0821 ***	-4.83	-1.8857	-0.0824 ***	-4.84
Share of institutional investors	1.2196	0.0536 ***	3.56	1.2826	0.0559 ***	3.78	1.2654	0.0553 ***	3.74
Share of minority shareholders	0.3422	0.0151	0.78	0.3420	0.0149	0.78	0.3322	0.0145	0.76
Debt-to-asset ratio	-0.8931	-0.0393 ***	1.24	-0.9355	-0.0408 ***	1.35	-0.8871	-0.0388 ***	1.33
Proportion of the firms that adopted	4.9801	0.2190	-3.19	5.4426	0.2373	-3.4	5.3515	0.2338	-3.16
Constant	-2.0345	***	-5.74	-2.0428	***	-5.82	-2.0773	***	-5.74
Number of obs	3392			3395			3395		
LR chi2	210.25			211.14			210.6		
Prob > chi2	0			0			0		
Pseudo R2	0.1746			0.1753			0.1749		
Log likelihood	-496.94			-496.63			-496.89		

Adopted 2007FY

	(1)			(2)			(3)		
Explanatory variable	Coef.	Marginal Effect	Z-value	Coef.	Marginal Effect	Z-value	Coef.	Marginal Effect	Z-value
ROA	0.7243	0.0616	1.4						
Tobin's Q				0.0047	0.0004	0.16			
PBR							0.0012	0.0001	0.10
Liquid asset ratio	-0.0233	-0.0020	-0.08	-0.0102	-0.0009	-0.03	0.0009	0.0001	0.00
Firm age	0.0018	0.0002	0.91	0.0019	0.0002	0.94	0.0018	0.0002	0.92
CEO's tenure	0.0061	0.0005	1.32	0.0062	0.0005	1.35	0.0062	0.0005	1.34
Proportion of outside directors	-0.0869	-0.0074	-0.29	-0.1202	-0.0103	-0.40	-0.1171	-0.0100	-0.39
Share of managerial ownership	-2.1819	-0.1856 ***	-4.4	-2.0423	-0.1744 ***	-4.16	-2.0410	-0.1745 ***	-4.18
Share of cross-holdings	1.1973	0.1018 **	2.36	1.1973	0.1022 **	2.35	1.1897	0.1017 **	2.34
Logarithm of market-value equity	0.0793	0.0067 **	2.24	0.0826	0.0071 **	2.33	0.0824	0.0070 **	2.34
Share of dominant shareholders	-2.3070	-0.1962 ***	-7.18	-2.2651	-0.1934 ***	-7.06	-2.2649	-0.1937 ***	-7.06
Share of institutional investors	0.1884	0.0160	0.53	0.2478	0.0212	0.70	0.2509	0.0215	0.71
Share of minority shareholders	-0.3576	-0.0304	-0.93	-0.3877	-0.0331	-1.01	-0.3838	-0.0328	-1.00
Debt-to-asset ratio	-0.1689	-0.0144	-0.75	-0.2128	-0.0182	-0.95	-0.2073	-0.0177	-0.91
Proportion of the firms that adopted	2.8940	0.2462 ***	2.63	2.9185	0.2492 ***	2.67	2.9288	0.2505 ***	2.68
Constant	-2.2451	***	-5.43	-2.2417	***	-5.42	-2.2387	***	-5.39
Number of obs	3357			3367			3362		
LR chi2	236.82			234.61			234.2		
Prob > chi2	0			0			0		
Pseudo R2	0.1426			0.1411			0.1409		
Log likelihood	-712.24			-714.04			-713.90		

Adopted 2008FY

	(1)			(2)			(3)		
Explanatory variable	Coef.	Marginal Effect	Z-value	Coef.	Marginal Effect	Z-value	Coef.	Marginal Effect	Z-value
ROA	0.5124	0.0207	0.94						
Tobin's Q				-0.1574	-0.0063	-1.34			
PBR							-0.0850	-0.0031	-1.48
Liquid asset ratio	-0.1462	-0.0059	-0.37	-0.0803	-0.0032	-0.20	-0.0553	-0.0020	-0.14
Firm age	0.0048	0.0002 *	1.90	0.0032	0.0001	1.31	0.0031	0.0001	1.24
CEO's tenure	0.0029	0.0001	0.51	0.0013	0.0001	0.23	0.0013	0.0000	0.23
Proportion of outside directors	-0.4251	-0.0172	-1.05	-0.4108	-0.0165	-1.01	-0.3834	-0.0140	-0.94
Share of managerial ownership	-1.0781	-0.0436 *	-1.83	-0.9491	-0.0381	-1.63	-0.9413	-0.0344	-1.61
Share of cross-holdings	1.4403	0.0582 **	2.41	1.2653	0.0508 **	2.12	1.2055	0.0440 **	2.00
Logarithm of market-value equity	0.1030	0.0042 **	2.45	0.1251	0.0050 ***	2.94	0.1274	0.0047 ***	2.95
Share of dominant shareholders	-2.5188	-0.1018 ***	-5.50	-2.5722	-0.1033 ***	-5.63	-2.5710	-0.0938 ***	-5.62
Share of institutional investors	-0.0863	-0.0035	-0.19	-0.1083	-0.0043	-0.24	-0.1146	-0.0042	-0.25
Share of minority shareholders	-0.2527	-0.0102	-0.55	-0.3269	-0.0131	-0.72	-0.3366	-0.0123	-0.73
Debt-to-asset ratio	0.1582	0.0064	0.54	0.0926	0.0037	0.32	0.2287	0.0083	0.76
Proportion of the firms that adopted	3.1535	0.1275 ***	4.02	3.1318	0.1257 ***	4.02	3.1515	0.1150 ***	4.04
Constant	-3.2803	***	-6.46	-3.1199	***	-6.25	-3.2718	***	-6.39
Number of obs	3215			3222			3212		
LR chi2	182.68			182.05			182.23		
Prob > chi2	0			0			0		
Pseudo R2	0.1718			0.1691			0.1694		
Log likelihood	-440.31			-447.29			-446.80		

Notes: We estimate Probit model in which the dependent variable takes the value of unity if the firm adopted antitakeover provisions and zero otherwise.
*, **, *** statistically significant at 10%, 5% and 1%.
LR chi2 is the Likelihood Ratio (LR) Chi-Square test that at least one of the predictors' regression coefficient is not equal to zero in the model.
Prob > chi2 is the probability of obtaining this chi-square statistic (LR chi2) if there is in fact no effect of the predictor variables.

Table 4 Endogeneity of the share of outside directors: Probit model with endogenous regressors

Adopted 2006FY			
Explanatory variable	Coef.		Z-value
ROA	0.260		0.39
Liquid asset ratio	-0.317		-0.87
Firm age	0.003		1.54
CEO's tenure	-0.004		-0.56
Proportion of outside directors	-0.038		-0.09
Share of managerial ownership	-3.288	***	-3.86
Share of cross-holdings	1.753	***	2.94
Logarithm of market-value equity	0.095	**	1.97
Share of dominant shareholders	-1.853	***	-4.76
Share of institutional investors	1.246		3.64
Share of minority shareholders	0.345	***	0.79
Debt-to-asset ratio	-0.885	***	-3.17
Proportion of the firms that adopt	5.273		1.31
Constant	-2.017	***	-5.7
Number of obs	3391		
Wald chi2(13)	140.59		
Prob > chi2	0		
Log likelihood	3436.14		
Wald test of exogeneity (/athrho = 0): chi2(1) = 1.54 Prob > chi2 = 0.2149			

Adopted 2007FY			
Explanatory variable	Coef.		Z-value
ROA	1.026	*	1.75
Liquid asset ratio	-0.040		-0.14
Firm age	0.002		0.91
CEO's tenure	0.007		1.45
Proportion of outside directors	0.037		0.1
Share of managerial ownership	-2.156	***	-4.35
Share of cross-holdings	1.007	**	2.01
Logarithm of market-value equity	0.053		1.53
Share of dominant shareholders	-2.215	***	-6.93
Share of institutional investors	0.086		0.25
Share of minority shareholders	-0.401		-1.07
Debt-to-asset ratio	-0.114		-0.51
Proportion of the firms that adopt	1.812	*	1.7
Constant	-1.978	***	-4.94
Number of obs	3499		
Wald chi2(13)	147.7		
Prob > chi2	0		
Log likelihood	3263.39		
Wald test of exogeneity (/athrho = 0): chi2(1) = 0.80 Prob > chi2 = 0.3712			

Adopted 2008FY			
Explanatory variable	Coef.		Z-value
ROA	0.899		1.21
Liquid asset ratio	-0.100		-0.25
Firm age	0.005	**	2.07
CEO's tenure	0.003		0.53
Proportion of outside directors	-0.039		-0.07
Share of managerial ownership	-0.660		-1.12
Share of cross-holdings	1.158	**	2.01
Logarithm of market-value equity	0.070	*	1.71
Share of dominant shareholders	-2.164	***	-4.9
Share of institutional investors	-0.242		-0.55
Share of minority shareholders	-0.167		-0.37
Debt-to-asset ratio	0.168		0.59
Proportion of the firms that adopt	1.737	**	2.31
Constant	-2.967	***	-6.08
Number of obs	3411		
Wald chi2(13)	87.56		
Prob > chi2	0		
Log likelihood	2744.27		
Wald test of exogeneity (/athrho = 0): chi2(1) = 1.78 Prob > chi2 = 0.1827			

Notes: *, **, *** statistically significant at 10%, 5% and 1%.

Wald test of exogeneity shows that the error terms in the structural equation (probit) and the reduced-form equation for the endogenous variable (i.e., the share of outside directors) are not significantly correlated, suggesting that the endogeneity bias in the baseline estimation is not significant.

Table 5 Firm value protection hypothesis: Probit model

	Adopted 2005FY			Adopted 2006FY		
Explanatory variable	Coef.	Marginal Effect	Z-value	Coef.	Marginal Effect	Z-value
R&D intensity(R&D expenditure as a proportion of	-0.386	-0.009	-0.35	-1.934	-0.101	-1.06
ROA	-0.622	-0.014	-0.74	0.523	0.027	0.7
Liquid asset ratio	0.856	0.020	1.57	-0.263	-0.014	-0.69
Firm age	0.000	0.000	-0.1	0.004	0.000 *	1.84
CEO's tenure	-0.024	-0.001 *	-1.85	-0.002	0.000	-0.32
Proportion of outside directors	0.146	0.003	0.28	0.422	0.022	1.22
Share of managerial ownership	-0.919	-0.021	-1.01	-3.155	-0.164 ***	-3.64
Share of cross-holdings	-0.242	-0.006	-0.27	1.675	0.087 ***	2.77
Logarithm of market-value equit	0.110	0.003 **	2	0.092	0.005 *	1.9
Share of dominant shareholders	-1.774	0.000 ***	-2.88	-1.884	-0.001 ***	-4.79
Share of institutional investors	0.043	0.001	0.07	1.133	0.059 ***	3.2
Share of minority shareholders	-0.108	-0.002	-0.16	0.203	0.011	0.45
Debt-to-asset ratio	-0.025	-0.001	-0.06	-0.849	-0.044 ***	-2.87
Proportion of the firms that adopted antitakeover provisions in the industry				6.616		1.58
Constant	-3.105	***	-4.65	-2.061	***	-5.72
Number of obs	2784			3037		
LR chi2	42.21			186.82		
Prob > chi2	0.0001			0		
Pseudo R2	0.0969			0.162		
Log likelihood	-196.72			-483.15		

	Adopted 2007FY			Adopted 2008FY		
Explanatory variable	Coef.	Marginal Effect	Z-value	Coef.	Marginal Effect	Z-value
R&D intensity(R&D expenditure as a proportion of	-0.062	-0.007	-0.13	-0.110	-0.005	-0.11
ROA	0.784	0.084	1.18	0.777	0.037	1.33
Liquid asset ratio	0.056	0.006	0.18	0.037	0.002	0.09
Firm age	0.001	0.000	0.58	0.004	0.000 *	1.7
CEO's tenure	0.007	0.001	1.37	0.002	0.000	0.32
Proportion of outside directors	0.000	0.000	0	-0.845	-0.040 *	-1.85
Share of managerial ownership	-2.058	-0.221 ***	-3.91	-1.655	-0.079 **	-2.35
Share of cross-holdings	1.256	0.135 **	2.39	1.215	0.058 *	1.91
Logarithm of market-value equit	0.068	0.007 *	1.85	0.074	0.004 *	1.67
Share of dominant shareholders	-2.236	-0.240 ***	-6.65	-2.604	-0.125 ***	-5.35
Share of institutional investors	0.226	0.024	0.61	0.018	0.001	0.04
Share of minority shareholders	-0.296	-0.032	-0.73	-0.412	-0.020	-0.83
Debt-to-asset ratio	-0.177	-0.019	-0.73	0.242	0.012	0.77
Proportion of the firms that adopted antitakeover provisions in the industry	2.143	0.230 *	1.87	3.312	0.159 ***	3.96
Constant	-2.075	***	-4.78	-2.959	***	-5.43
Number of obs	2727			2607		
LR chi2	186.05			162.52		
Prob > chi2	0			0		
Pseudo R2	0.1224			0.168		
Log likelihood	-666.79			-402.31		

Notes: We estimate Probit model in which the dependent variable takes the value of unity if the firm adopted antitakeover provisions and zero otherwise.
*, **, *** statistically significant at 10%, 5% and 1%.

Table 6 Panel Estimation

Random effects probit model			
Explanatory variable	Coef.		Z-value
ROA	1.894		1.32
Liquid asset ratio	0.154		0.18
Firm age	0.017	***	2.81
CEO's tenure	-0.005		-0.32
Proportion of outside directors	1.146		1.35
Share of managerial ownership	-13.425	***	-8.25
Share of cross-holdings	6.845	***	4.83
Logarithm of market-value equity	0.780	***	7.41
Share of dominant shareholders	-13.771	***	-14.14
Share of institutional investors	-0.484		-0.5
Share of minority shareholders	0.150		0.15
Debt-to-asset ratio	-2.957	***	-4.51
2006FY dummy	4.064	***	10.97
2007FY dummy	7.007	***	15.44
2008FY dummy	8.306	***	16.86
Constant	-20.243	***	-14.31
Number of obs	14122		
Number of groups	3840		
Wald chi2	515.98		
Log likelihood	-1950.6493		
Likelihood-ratio test of rho=0	2384.53		
Prob >= chibar2	0.00		

Notes: We estimate a Random effects probit model.
The dependent variable is a dummy that takes unity if the firm adopted antitakeover provisions in the year or after and zero otherwise.
*, **, *** statistically significant at 10%, 5% and 1%.